

# ERECTA SWITCH

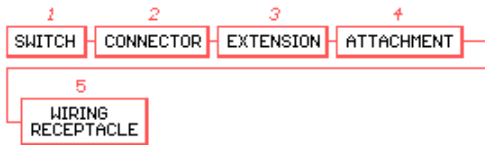
## INSTRUMENT CONSTRUCTION SET

### BUILDING BLOCK SYSTEM

ERECTA SWITCH is a building block system of parts and assemblies that lets you construct common and not so common sensing instruments. It's a product that reduces cost as much as 90% and allows you to create what's needed in about the time it takes you to read this page.

### IT STARTS WITH A SWITCH

Flow, liquid level and temperature switches are the system's sensing elements. This is where things usually start. Specially designed ERECTA SWITCH hardware complements the sensors making a variety of constructions and permutations possible. Projects start with the selection of the sensing switch. Then by attaching ERECTA SWITCH components, geometries are altered, functions expanded and previously expensive functions become practical and affordable.



Like any construction set, what is built and its purpose, is in the "eye" of its designer. That's you. Creations can be freshly imaginative because there are no bounds beyond the physical limitations of the ERECTA components. The factorial combination of size, material, function and geometry is enormous. Anything can be possible. Uses will transcend classical sensing switch applications. ERECTA SWITCH solutions provide many new options for the plumbing or interconnection of liquid, gas and electrical wiring.

### IT'S AS EASY AS IT GETS

ERECTA components are precision, screw together, snap together construction parts and assemblies. Wet attachment interfaces are O-ring sealed. Active components, like the liquid level and flow sensors, are factory assembled so your role is basically one of screwing and snapping a few pieces together.

### WORKS WITH ANY PIPE THREAD DEVICE

ERECTA threads are standard NPT and NPS pipe threads. Although the components are designed as companions to Compac products, they are usable with any part or product having complementary threads. ERECTA SWITCH adapters, bulkhead fittings, precision nipples, connectors, support brackets, wiring receptacles and relay housings invite applications having nothing to do with Compac switch products. For example, they may be used as plumbing for any compatible fluid or wiring need.

Suppose you need a low cost sight gage. Use our translucent Polypropylene pipe nipple with a couple of our bulkhead angle connector sets and you have "instant sight gage". Add our wiring receptacle to any device having a 1/8" to 1/2" pipe connection at the pigtail egress and have a weather resistant place to make that splice or connection. Need a low cost 55 gallon drum switch that tells you when the drum is empty? That's easy. Add our extended stem set and 2" adapter to a liquid level switch and you get a drum switch for about \$20.00 in 100 piece lots.

### EVEN THE COMPETITION WINS

Many installations can be made more cost effective by combining ERECTA SWITCH hardware with sensing switches manufactured by others. If you manufacture control devices which must withstand the effects of a corrosive liquid . . . enhance your product while reducing cost by incorporating ERECTA SWITCH. Add your expertise to our wide range of accessories and dazzle your customers with quick, inexpensive solutions.

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### NO BIG DEAL

There's no need to abuse simple technology by making it a "big deal" to add a switch or change a mounting. With ERECTA SWITCH, changes like this are a matter of buying a box of parts. Make it longer. Make it shorter. Add switches. Mount it where you want it . . . . This is what ERECTA SWITCH does.

### SMOOTH APPROACH

Before ERECTA SWITCH arrived on the scene, designs which permitted efficient manufacture could not be easily changed to accommodate special needs. So when changes were made, it amounted to a custom effort and fabricated construction. Often expensive and usually not of the same quality as a tool designed, the custom fabricated product is at best, problematic.

ERECTA SWITCH has changed all of this. Established, tooled products can now be reliably transformed to achieve new functions. Add a switch here, a switch there, a few pieces of hardware . . . . Quickly, an inexpensive solution, can be put together by just screwing and snapping a few parts.

### COMPONENTS, SETS AND CONSTRUCTION SCHEMES

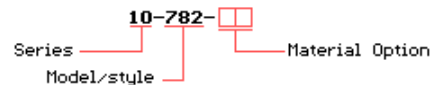
The expansive nature of a building block concept requires that product possibilities be confined so the line is easy to deal with. Our electronic catalogs show the line as switches, components, switch sets and component sets. Sets are shown as dimensioned assemblies accompanied by the list of constituent components. How the components are intended to be put together is portrayed in easily understood graphics.

A collection of suggested plans for the building of frequently encountered instrument constructions are also provided. We call these plans "construction schemes". Schemes are plans for a project rather than a product you can purchase.

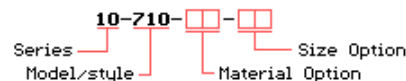
### NOMENCLATURE INTERPRETATION

For purposes of screen and document display, nomenclatures are constrained to 12 characters. Although our naming system is rule driven, growth has produced some stretching of the rules. Nevertheless, the system is consistent and easily understood.

The system first identifies the set's series or family, then the style considerations, then the material option and finally the size selection when applicable. Selectable variable attributes such as material and size are always shown as empty boxes. I.E.;



Here's another example:



### PRODUCT ORGANIZATION AND SELECTION

Products are organized as sets, identified by their series number; 5, 15, 20 and so on. Sets are headed by a switch or family of switches which share common attributes. So you must first determine the switch of interest and its series number. Then select from the series component set the particular switch, switch set, parts, or parts sets required.

• Remember . . . .

1. SERIES
2. MODEL/STYLE
3. MATERIAL OPTIONS
4. SIZE OPTIONS

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**MATERIAL SELECTION**

ERECTA SWITCH products are optionally available manufactured of Polypropylene, Acetal or Kynar PUDF.

When material options are offered, two characters are provided in the product's nomenclature for purposes of material selection and specification. I. E.; 15-650-PP (PP denotes Polypropylene)

We suggest material selection be based upon compatibility with the application's environment. Pressure, temperature and chemistry will be important factors. Generally speaking, Polypropylene, and Kynar PUDF are suited for water based solutions. Acetal is suggested for hydrocarbon applications such as Gasoline and Lubrication Oil.

**IDENTITY**

Our Polypropylene products are colored gray, black and blue. 10% glass fibers are added to improve performance at cold temperature and to facilitate our welding process. Polypropylene is often called "poor man's" Teflon because of its low cost and high nobility. "Polypro" is the popular choice for most water based applications.

Acetal products are colored red and characterized by their toughness and smart shiny appearance. When strength and resiliency are important, Acetal may be the best choice. It is compatible with many solvents and will handle alkaline water based solutions over a wide temperature range.

Kynar PUDF is light tan in color. It is characterized by its high nobility in the presence of corrosive environments. PUDF is a high density material which may limit its application in low specific gravity liquids.

Often, the materials used for other parts of your system will suggest an acceptable selection. I. E. ; If the tank, pump and valves are manufactured of polypropylene, why not use polypropylene for the liquid level or flow switch as well?



Performance data covering over 500 chemicals are presented in our ChemChart program for the PC. This Chemical Resistance chart program, for IBM and IBM compatible computers, provides information about corrosion resistance and the effects of corrosion on mechanical properties of Polypropylene, Acetal and Kynar PUDF. See Product Guide page 61 for ordering instructions. If you are reading this page on your computer screen now, press [Esc] to return to the main index. You can then select ChemChart to review or printout the Chemical Resistance chart.

Keep in mind, temperature and other environmental factors will influence chemistry. For pressure, temperature and specific gravity ratings, select "Application Environment" on the main index.

**ANCILLARY COMPONENTS**

Springs are Titanium metal or T-316 Stainless Steel depending upon the product selected. O-rings are Viton fluorocarbon rubber.

**FINEST AVAILABLE**

Only the very best materials are used. Premium switches, manufactured by Yaskawa Electric and OKI Electric Companies of Japan are of the highest quality. Our plastic raw materials are manufactured and formulated by Eastman Chemical, ICI/LNP, General Electric, Celanese and ATOCHEM of North America. Our plastic material options, offer solutions for the widest possible application range. And . . . we do the molding so regrind, contaminant control and process replication is totally under our control. Simply stated, there are no better materials available for this class of product.

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**ANOMALIES**

Parts are injection molded in the same mold regardless of material. Molds are designed to produce design dimensions when molding our Polypropylene formulation. As result, Acetal and Kynar parts have slightly different dimensions. They are smaller than their Polypropylene counterparts. Assemblies made from parts of like materials will fit correctly. Mixed material assemblies will exhibit fit problems, particularly at threads and snap attachments.

**SPECIAL CONSIDERATIONS**

Excluding the effects of chemistry and corrosion resistance, successful operation at high temperature has little to do with the melting point of our plastic materials. Melting points are above 171°C and our products are rated at 90°C. Of greater concern is the relatively high coefficient of expansion of the plastic structures and the impact this has on the stability of the switching device. Kynar PUDF exhibits the largest dimensional excursions. That plastic structures expand and contract several thousandths of an inch over the 0 to 90 C range suggests application at or near these extremes should be questioned. Consider, for example, the forces likely to occur when a plastic part is mated to a metal part and temperature extremes are encountered. When in doubt, performance verification tests should be considered.

**INSTALLATION TIDBITS**

Isolate pull stresses when stripping leadwires. Temporarily protect pipe surfaces from tool marks with tape. Dampen male threads and O-ring seals with liquid soap prior to assembly. Redundant O-rings enhance seal reliability when all O-rings are engaged. Diameter seals are engaged by virtue of the assembly dimensions. End seals, however, must be engaged during the act of assembly. Consider a technique to confirm engagement. I.E.; confirm end seal engagement by measurement. An effective end seal can be achieved with .010" to .020" seal compression. Avoid excessive engagement as this may scuff the O-ring causing it to slide out of position.

When screwing switches to other assemblies, allow the free ends of the leadwire to rotate. If necessary, help the process along so that wires do not become twisted.

When possible, adopt a tentative approach to assembly. That is, first assemble components, in their logical sequence, hand tight. Then methodically tighten joints to achieve correct seal engagement.

**CAVEATS**

ERECTA SWITCH users get more instrument at less cost compared to any other method or product available to the OEM. However, there are inescapable caveats:

- The ERECTA SWITCH concept assumes the user knows what he is doing. This is an OEM product intended for OEM manufacturers. It should only be purchased by those intending to assume responsibility for the construction outcome.
- Use only in those applications which are known to be electrically, chemically and mechanically compatible. Do your homework. Perform tests.
- Deal with reactive loads in whatever way necessary to subdue arcing at the switch element contacts.
- Make certain O-ring seals are in fact engaged.
- Avoid assembly or installation procedures which result in bending, stressing or shocking the switching element. *In other words, don't drop, bend or squeeze switches.*

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**LEVEL OF DIFFICULTY DEFINITIONS**

Essentially, this is a concept in which fully manufactured and tested switches and components are shipped ready for use. They connect to one another so assembly is usually a matter of snapping or screwing elements together. ERECTA SWITCH constructions do not require glue, solder or part machining. And, our detailed catalog drawings are often adequate for documentation purposes.

The level of difficulty to construct a set or scheme is assigned as level 1, 2, 3 or 4. Set and scheme pages show this assignment below the date in the ERECTA SWITCH block at the lower right hand corner of the page.



The assigned level is noted below the edit date in the ERECTA SWITCH block on set and scheme page. Assignments are explained as follows:

**LEVEL 1 - \* 30 seconds.**

Snapping/screwing two or three parts together. One or two O-rings may be part of the assembly. Requires open end wrenches and thread lubricant. Intuitive assembly.

**LEVEL 2 - \* 120 seconds.**

Single switch station construction. Requires screwing and/or snapping several parts together. One or more O-rings may be part of the assembly. Tapered pipe threads require application of Teflon tape sealant. Requires open end wrenches, thread lubricant and continuity checker. Intuitive assembly. Assembler must interpret Set and Scheme catalog drawings. Dry operational test performed prior to use.

**LEVEL 3 - \* 240 seconds.**

Multi switch construction. Requires screwing and/or snapping several parts together. Several O-rings may be part of the assembly. Tapered pipe threads require application of Teflon tape sealant. Components go together in sequence. Requires open end wrenches, crimp tool, thread lubricant and continuity checker. Disciplined assembly. Assembler must interpret Set and Scheme drawings. Dry operational test performed prior to use.

**LEVEL 4 - \* 360 seconds.**

Multi switch constructions with interface devices and/or cable assemblies. Requires screwing and/or snapping several parts together. Several O-rings may be part of the construction. Components go together in sequence. Tapered pipe threads require application of Teflon tape sealant. Requires open end wrenches, crimping tool, thread lubricant, screw driver and continuity checker. Disciplined assembly. Assembler must interpret Set and Scheme catalog drawings. Dry operational test performed prior to use.

\* Experienced assemblers easily achieve noted construction times.

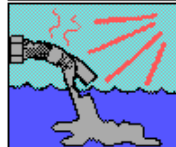
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**CLASSICAL PROBLEMS****INCOMPATIBLE LIQUIDS**

Understanding that a chemical may have deleterious effects on our product's plastic structure is essential. Assuming compatibility with the chemistry, consideration must then be given to the nature of the liquid. How does it flow? What's floating around in it?, etc. Is it a saturated solution that may precipitate salts on the float? Is it a high viscosity liquid? Is it sticky? Are there iron particles which may be attracted by the magnets? . . . With this in mind, using our product in any liquid other than clear water should be preceded by tests.

**HAVE MOTION - TURBULENCE**

Single point level switches have small differentials between their on and off states. If installed at the surface of a reservoir of moving liquid, they will respond to the waves and ripples. This means the switch may be switching on and off many time per minute. A situation that may drive the load device "crazy" and contribute to early system failure. To inhibit the effect of wave motion and turbulence use a slosh shield. If this is not practical, inhibit the switch with a time delay relay or use two switches and a latching relay to expand the differential.

**RADIANT HEAT**

A common application for small level switches is the control of make-up water. As long as the switch is in water, we can assume the ambient temperature is within its capabilities. However, care must be taken to locate the switch so that it is not exposed to heat radiating from or reflected by heating elements. Excessive temperature could warp or otherwise deform the plastic parts.

**INCOMPLETE ASSEMBLY**

ERECTA SWITCH assemblies can be configured in endless ways to accommodate just about any need. However, if reliability is an objective, they can only be assembled one way . . . and that's the correct way. O-rings must be present, threads must be correctly engaged and present, threads must be correctly engaged and tightened; all with an appreciation for the component's function and the mechanical peculiarities of plastic parts and assemblies.

**FAIL SAFE INSTALLATION**

Prudent engineers, like good pilots, always allow themselves a way out. It's good sense to install automatic control devices so that they will fail safe. I. E.; power supply failure should not cause liquids to overflow. Failure of a relay or motor starter should not cause liquids to overflow. And failure of a level, flow or temperature switch should not cause an unsafe condition. Predictable off normal conditions should be satisfied by prudent fail safe design. If this can not be achieved by circuit or component configuration, then a backup scheme must be put into place. Going automatic doesn't abrogate responsibility for the predictable.

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## CLASSICAL PROBLEMS



### SWITCHING CAPACITY

This is, perhaps, the most misunderstood capability of reed switch equipped devices such as our liquid level and flow sensing switches. Switching an incompatible load is an invitation to failure. Please read the pages of this catalog entitled "Electrical Interfacing".



### IMPACT SHOCK

We cradle the glass reed switch in a stress relieved support system and then lock it into place with a specially formulated, compatible potting compound. "Reeds" survive reasonable mishandling. This does not include dropping the product. The product may look like it's resilient . . . but it is not. Any fall may damage the unit. A dropped unit may look OK or even test OK but still be damaged inside. The bottom line is . . . don't drop switches. And if it should happen, then discard the suspect switch.



### PLASTIC CONSTRUCTION

The dictionary definition for "plastic" includes the following: "easily influenced or manipulated; impressionable; pliable, suggests something easily bent, twisted or manipulated." Our products are manufactured of plastic and therefore should be characterized accordingly. Our choice of Polypropylene, Acetal and Kynar is based upon the aggregate of these combined attributes:

- Resistance to chemical attack.
- Mechanical rigidity and stability.
- Mechanical stability over a wide temperature range.
- Dielectric strength.

All of our materials can be bent, squeezed or stressed. Stressed materials will exhibit some degree of "cold flow". With this in mind, reasonable care must be used during installation. Use appropriate tools. Apply torque only to the hex. Avoid manipulations that may transmit force into the product. Isolate pull forces on leadwires when stripping wire ends.



### CONDENSATION

In situations in which conditions make it possible for condensation to form, users must take measures to prevent water from entering switches at the leadwire egress. Although wires are surrounded by potting compound, the bond between potting compound and plastic parts is basically one of cohesion since our plastic materials are essentially non stick surfaces. If water is present at the egress, sooner or later it may penetrate the switch cavity, resulting in switch malfunction. If there is a possibility for condensation to form, do something about it. Vent a low spot in the conduit so a drain exists and apply a generous amount of sealing compound at the egress as an additional measure of seal integrity.

CP-2

## CONSTRUCTION SERVICES



### ERECTA SWITCH ASSEMBLY/CONSTRUCTION SERVICES

If putting sets together or making working instruments is not for you . . . that's OK. Our VADs will do it for you. A full range of affordable assembly and construction services are provided by our authorized VADs (Value Added Distributor). VADs are both stocking distributors and factory trained assembly service providers.

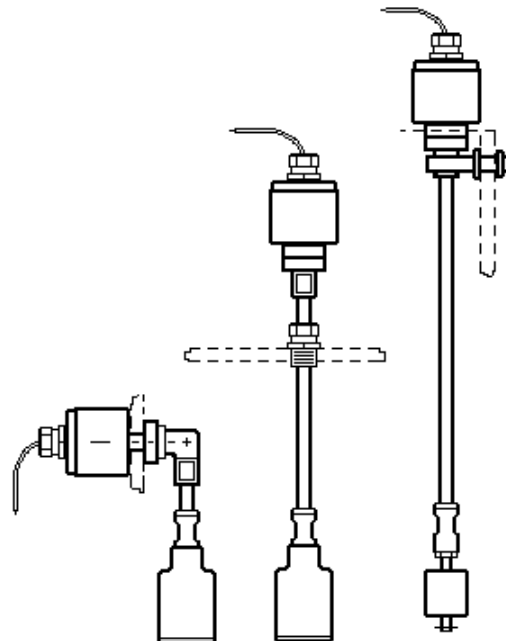


**DURABLE CONTROLS**

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